

NON-PUBLIC?: N
ACCESSION #: 9109250071
LICENSEE EVENT REPORT (LER)

FACILITY NAME: H.B. Robinson Steam Electric Plant, PAGE: 1 OF 4
Unit No. 2

DOCKET NUMBER: 05000261

TITLE: Reactor Trip Due to Failure of Condensate Pump Shaft
EVENT DATE: 08/30/91 LER #: 91-011-00 REPORT DATE: 09/18/91

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: R. D. Crook, Sr. Specialist, TELEPHONE: (803) 383-1179
Regulatory Compliance

COMPONENT FAILURE DESCRIPTION:
CAUSE: B SYSTEM: KA COMPONENT: P MANUFACTURER: B580
REPORTABLE NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On August 30, 1991, at 0700 hours with Unit No. 2 operating at one hundred percent power, an automatic reactor trip was received from a "C" Steam Generator low level coincident with a steam flow/feed flow mismatch. The cause of this trip is attributed to failure of the "B" Condensate Pump shaft, which resulted in inadequate feedwater flow to the steam generators. The Plant was brought to shutdown conditions using Emergency Operating Procedures, and was stabilized at 0711 hours. The NRC was notified of this event via the ENS at 0830 hours pursuant to 10 CFR 50.72(b)(2)(ii).

Repairs to the "B" Condensate Pump will require use of a pump that has been previously in service, and is awaiting refurbishment. Until this pump can be placed back in service, the Plant will operate at approximately sixty five percent power, which can be achieved with

adequate feedwater being supplied with only one condensate pump in operation.

This Licensee Event Report is being submitted in accordance with 10 CFR 50.73(a)(2)(iv).

END OF ABSTRACT

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I. DESCRIPTION OF EVENT

On August 30, 1991, H. B. Robinson Unit No. 2 1_/ was operating at one hundred percent power. At approximately 0657 hours, licensee Operations personnel experienced inadequate feedwater flow indication, and began performing the immediate actions of Abnormal Operating Procedure AOP-010, "Inadequate Feedwater Flow". At 0700 hours, the plant experienced insufficient feedwater flow, which resulted in a reactor trip due to "C" Steam Generator low level coincident with steam flow/feed flow mismatch. Licensee Operations personnel performed the immediate actions of the Emergency Operating Procedures, and the plant was stabilized at 0711 hours.

At 0830 hours, notification was made to the NRC via the Emergency Notification System. This notification was made pursuant to 10 CFR 50.72(b)(2)(ii) as a condition that resulted in automatic actuation of any Engineered Safety Feature, including the Reactor Protection System.

II. CAUSE OF EVENT

Upon investigation into the cause of this event, it was found that "B" Condensate Pump 2_/ had experienced a shaft shear. The shear was initiated by a flaw or crack that started from the groove for the split ring just above one of the two keyways in the stub shaft. It propagated across the shaft in a plane that was perpendicular to the axis of the shaft.

The pump was operating with the Plant at one hundred percent power delivering normal flow at the time of the failure. During the event licensee operators noted that the Main Control Board indicated that all condensate, feedwater, and heater drain pumps were running. Licensee operators were dispatched to look for feedwater leaks, and when none were found, the condensate pumps were investigated to determine if any were damaged. The investigation revealed that "A" Condensate Pump was operating at approximately 305 amps with 600

pounds of discharge pressure, and "B" Condensate Pump operating at approximately 60 amps with zero discharge pressure, Thus, the "B" condensate Pump presented indications of a shaft shear. Subsequent investigation revealed that the shaft failure did not cause significant damage to the suction/discharge head area.

1_/H. B. Robinson Steam Electric Plant, Unit No. 2, is a Westinghouse Pressurized Water Reactor power plant in commercial operation since March, 1971.

2_/EIIS Codes: System - KA; Component - P, Manufacturer - B580

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III. ANALYSIS OF EVENT

This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv), as "Any event or condition that resulted in manual or automatic actuation of any engineered safety system, including the Reactor Protection System."

There was no adverse impact on safety as a result of this event. The Condensate Pump is not classified as safety related equipment. The Final Safety Analysis Report (FSAR) accident scenario for loss of normal feedwater flow states that the reactor trips early due to the steam generator low-low level reactor trip. Sufficient heat rejection capacity remains at this steam generator water level to avoid approach to Departure from Nucleate Boiling (DNB) and to assure a short-term controllable response. An alternative supply of feedwater from the condensate storage tank is available with the auxiliary feedwater pumps, which assures long-term and orderly recovery of the unit. During this event, both motor driven auxiliary feedwater pumps operated to fulfill this function. This event was bounded by the FSAR Chapter 15 analysis and overall safety significance was minimal.

IV. CORRECTIVE ACTIONS

On August 31, 1991, at 0557 hours, the Plant was returned to power with only one Condensate Pump in operation. Adequate feedwater can be supplied with only the "A" Condensate Pump in operation up to approximately sixty five percent reactor power.

Repairs to the "B" Condensate Pump will require maintenance and repairs to a previously used pump that is currently on site. The

manufacturers' technical representative has inspected this pump, and has recommended that the upper and lower bearings be renewed. The pump shaft has also been inspected by CP&L Non-Destructive Examination personnel, and an indication was noted in the pump shaft end of the keyway near the split ring groove, which is an equivalent position to that of the failed stub shaft. The indication was successfully removed with a limited amount of pencil grinding. Also, the sharp edges of the pump and stub shafts, which are considered as stress risers, were machined prior to reassembly.

The pump and motor will be reassembled with the spare pump and a new stub shaft. Upon completion of the above repairs, the pump will be placed in service and will be operating at approximately five percent below its design curve due to three previous cycles of use. Based on experience from previous cycles, sufficient condensate pump

capacity is available to operate with a total of eight to ten percent head loss on each pump.

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IV. CORRECTIVE ACTIONS (Continued)

CP&L is currently evaluating the need to inspect the "A" pump for similar indications at the next available opportunity, as well as to formulate long term corrective actions to prevent occurrence of a shaft failure.

V. ADDITIONAL INFORMATION

A. Failed Component Information

This event was attributed to failure of the "A" Condensate Pump stub shaft. The pump is manufactured by Byron Jackson Company, EHS Codes: System - KA; Component - P; Manufacturer - B580.

B. Previous Similar Events

None

ATTACHMENT 1 TO 9109250071 PAGE 1 OF 1

CP&L
Carolina Power & Light Company
ROBINSON NUCLEAR PROJECT DEPARTMENT
POST OFFICE BOX 790

HARTSVILLE, SOUTH CAROLINA 29550

SEP 18, 1991

Robinson File No: 13510C RNP/91-2288
(10CFR50.73)

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
LICENSEE EVENT REPORT NO. 91-011-00

Gentlemen:

The enclosed Licensee Event Report (LER), is submitted in accordance with
10 CFR 50.73 and NUREG 1022, Supplements No. 1 and 2.

Very truly yours,

R. H. Chambers
General Manager
H. B. Robinson S. E. Plant

RDC:sgk

Enclosure

cc: Mr. S. D. Ebner
Mr. L. W. Garner
INPO

*** END OF DOCUMENT ***
